Energy Information Administration www.eia.doe.gov

COUNTRY ANALYSIS BRIEFS

Peru

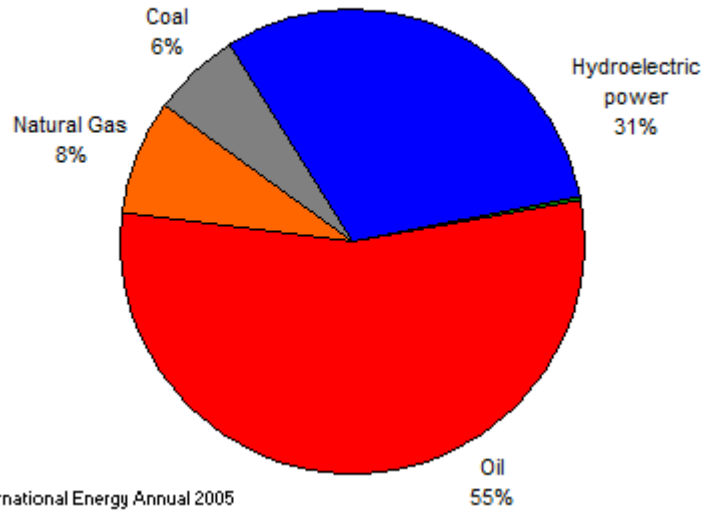
Last Updated: June 2008

Background

Peru is developing into an important regional producer of natural gas with the development of the Camisea project.

Oil is the dominant fuel source in Peru. In 2005, oil represented 55 percent of Peru's total energy consumption of 0.6 quadrillion Btus. Hydroelectricity is the second-largest component, representing 33 percent in 2005. However, the development of the Camisea natural gas project has led to increased use of natural gas in the residential, industrial, and power generation sectors. In addition, the development of an integrated liquefied natural gas (LNG) terminal will allow Peru to become an important regional exporter of natural gas in the near future.

Total Energy Consumption in Peru, by Type (2005)

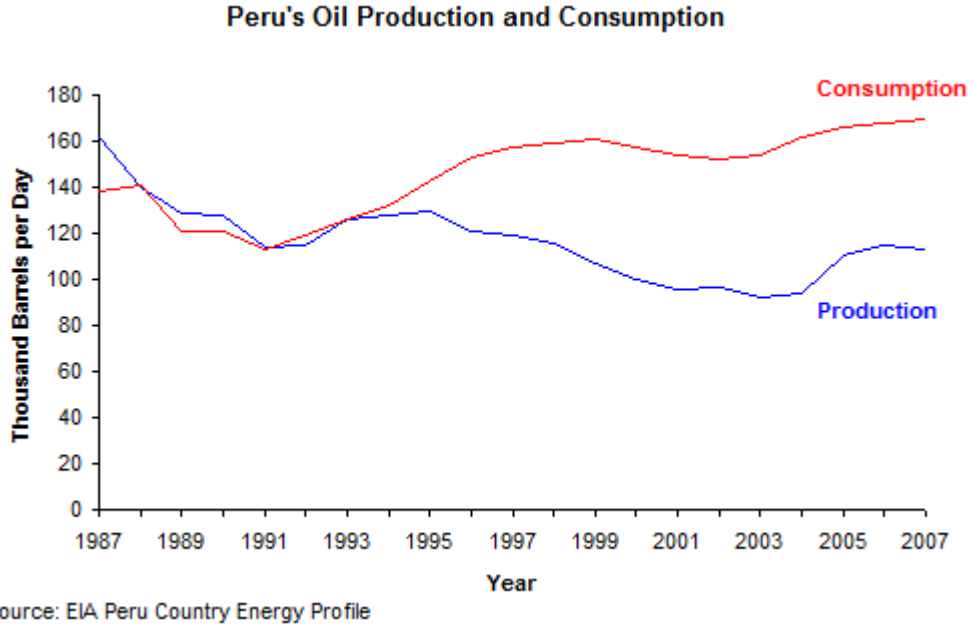


Source: International Energy Annual 2005

Oil

Despite substantial oil production, Peru is a net oil importer.

According to *Oil and Gas Journal* (*OGJ*), Peru had 380 million barrels of proven oil reserves in 2007. The country produced 113,000 barrels per day (bbl/d) of total oil liquids in 2007, of which 68 percent was crude oil. This was slightly lower than 2006 levels, but much higher than 2003 production of 92,000 bbl/d: increasing natural gas liquids (NGL) production represents the bulk of the increased oil production in recent years, as crude oil production in Peru has been in long-term decline for the last decade. In 2007, Peru consumed an estimated 170,000 bbl/d, leaving net imports of about 57,000 bbl/d of oil. Most imports come from Ecuador and other South American countries.



Source: EIA Peru Country Energy Profile

The largest oil producer in Peru is Argentina-based Pluspetrol, which controls over one-half of the country's entire crude oil production. Peru mostly privatized the former state-owned oil company,

Petroperu, in 1993. Still, Petroperu continues to play an important role in the oil sector, including the operation of the country's oil crude oil pipeline and most of the refineries.

Exploration and Production

Peru's crude oil production is concentrated in the northern part of the country. In particular, the largest oil blocks are Block 1-AB (Pluspetrol) along the border with Ecuador, Block 8 (Pluspetrol) in the northeastern Amazon region, Block X (Petrobras) in the northwest, and Block Z-2B (Petro-Tech Peruana) off the northwest coast. Block 1-AB and 8 account for almost two-thirds of Peru's total crude oil production. Most of the crude oil produced in Peru is a heavy, sour variety known as "Lorento," with 20° API and 1.2 percent sulfur c ontent.

In 2006, Barrett Resources announced that it would spend $1 billion to develop Block 67, located in Peru's Amazon region. Exploration at Block 67 first discovered commercial quantities of crude oil in the late 1990s. At the time, there was no decision to proceed with the project, but rising world oil prices have caused a re-evaluation of the area. The project could begin production by 2010, eventually reaching 100,000 bbl/d. In early 2008, Barrett Resources was purchased by Perenco, which has continued to develop the project. In March 2008, Perenco awarded a contract for a feasibility study of a pipeline between Block 67 and the existing Norperuano pipeline system.

In 2008, Petro-Tech announced that it had made a major discovery in the offshore Z-6 block. The company stated that production there could begin as early as 2010. Petro-Tech had previously announced Peru's first offshore oil discovery in 2005, the San Pedro 1X well in Block Z-2B. The well had initial test production of 1,200 bbl/d. In 2004, Occidental Petroleum announced that it had discovered at least 100 million barrels of recoverable reserves in Block 64, located in the Amazon basin; the company also announced that it would increase its investments in Blocks 101 and 103 in the same area.

Peru held its latest oil licensing round in 2007. Perupetro signed exploration contracts for 13 blocks. South Korea's SK Energy won rights to the offshore Z-46 block in the Trujillo Basin. The country launched a new licensing round in early 2008, with 17 blocks on offer.

Pipelines

Petroperu operates the country's sole crude oil pipeline, Norperuano, which links the export terminal at Bayovar to oil fields in Peru's interior. Norperuano has two branches, one (190 miles) starting at San Jose de Saramuro in the Ucayali basin, the other (160 miles) starting at Andoas in the Maranon basin. Both branches meet at a central pumping station, where they join into a 35-inch system that carries crude oil 340 miles to the Pacific coast. Norperuano has a maximum capacity of 250,000 bbl/d.

Downstream Activities

Peru has six major oil refineries, according to *OGJ*, with total capacity of 192,950 bbl/d. Repsol-YPF controls the largest facility in the country, La Pampilla, located in Lima, with a capacity of 102,000 bbl/d. The other privately-operated refinery in the country is the 3,250-bbl/d Purcallpa, operated by Maple Gas. Petroperu operates the remaining four refineries and the largest network of retail oil products distribution. According to media reports, Petroperu will pursue a $1 billion expansion of the Talara refinery, which will increase throughput capacity to 100,000 bbl/d (from 62,000 bbl/d), upgrade processing units there that will allow the facility to handle heavy crude varieties, and produce low-sulfur fuels.

Alternative Fuels

Increasing production of natural gas in Peru has opened greater possibilities for automobiles powered by compressed natural gas (CNG). Lima, the capital, reportedly has at least three CNG refueling stations, with an additional ten in the planning stages; in 2008, media reports indicated that Clean Energy del Peru opened the world's largest CNG refueling station in Lima. According to local industry sources, gasoline consumption in Peru in 2006 was 20 percent lower than recent years, owing to greater vehicular consumption of CNG. Besides increased local production, the favorable tax status and low prices of these alternative fuels has also popularized their use.

Biofuel consumption in Peru has also risen significantly in recent years. Pure Biofuels is reportedly building a biodiesel production facility near Lima that will have a production capacity of 52.5 million gallons per day (3,400 bbl/d). Energy firm Maple is planning an integrated sugarcane-ethanol facility outside of Lima that will produce 30 million gallons of ethanol per year (2,000 bbl/d) targeted towards the export market. The Peruvian government has established a goal of

blending gasoline with at least 7.8 percent ethanol by 2010.

Natural Gas

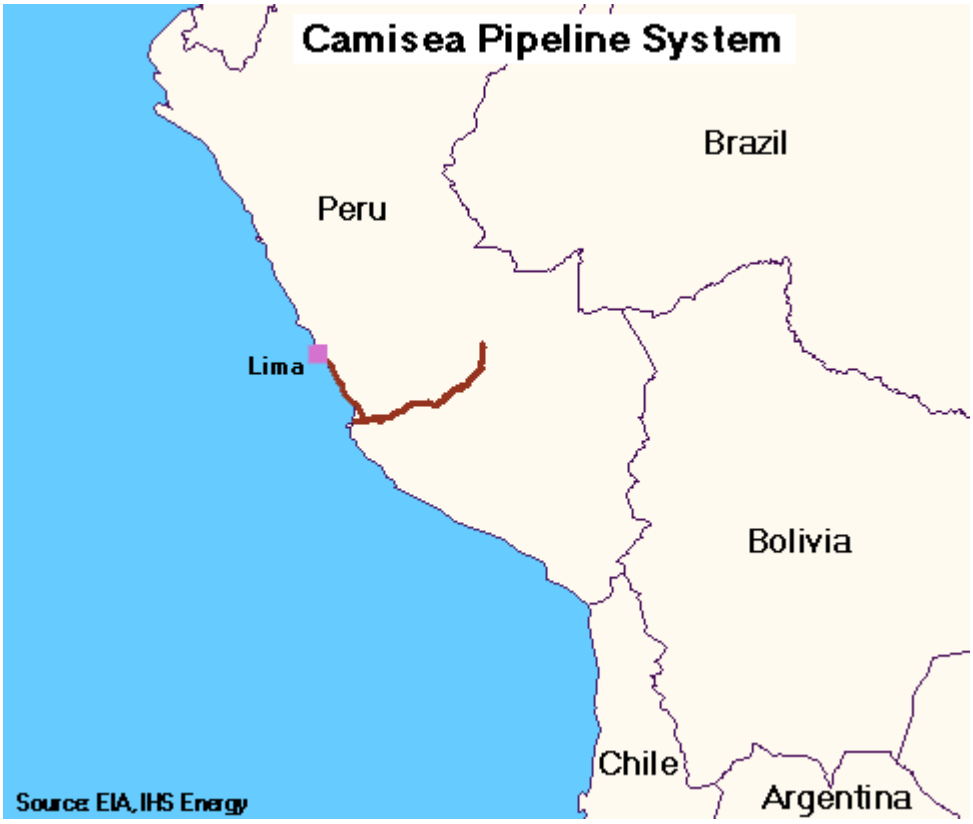
Peru's development of the Camisea project has led to a rapid increase in the country's natural gas production.

According to *OGJ*, Peru had proven natural gas reserves of 11.9 trillion cubic feet (Tcf) in 2008, the fifth-largest amount in South America. Peru hopes to increase natural gas use in its economy and reduce reliance upon oil and fluctuating hydroelectricity. In 2006, the country produced and consumed 63 billion cubic feet (Bcf) of natural gas, about 13 percent higher than the previous year. The startup of production at the Camisea project in August 2004 (see below) was the principle force behind this large increase, and the continued ramp-up of production there will likely cause Peru's natural gas production to increase further in coming years.

Exploration and Production

Camisea

The Camisea project consists of several natural gas fields located in the Ucayali basin of southeastern Peru, principally in Block 88 along the Camisea River. Analysts estimate that Block 88 contains 11 Tcf of proven plus probable (P2) natural gas reserves and 482 million barrels of associated natural gas liquids (NGLs). An international consortium has developed the upstream portion of Camisea, with Pluspetro as the project operator. The initial production capacity at Camisea was 450 million cubic feet per day (Mmcf/d) of natural gas and 34,000 bbl/d of NGL. However, output capacity is expected to increase steadily, as drilling continues on Camisea's Block 56, adjacent to Block 88. Transportadora de Gas del Peru (TGP), a consortium led by Techint, constructed and now operates parallel natural gas and NGL pipelines that carry Camisea production to Lima and to a fractionation plant in Paracas.



Peru LNG

The Camisea project provides natural gas for domestic consumption; however, the ultimate goal of the project is the export market. Hunt Oil leads the Peru LNG consortium, which broke ground in January 2006 on a liquefied natural gas (LNG) export terminal at Pampa Melchorita, 105 miles south of Lima. The Peru LNG facility will have an operating capacity of 4.2 million tons per year, with first exports expected in 2010. In October 2007, Peru LNG awarded a contract to Techint for construction of the 250-mile pipeline that will connect the Camisea field to the LNG terminal. In late 2007, the Inter-American Development Bank (IDB) approved a $400 million loan package for the pipeline project.

Repsol-YPF, a member of the Peru LNG consortium, has already purchased rights to the entire output of the facility. In late 2007, the company concluded a contract with CFE, Mexico' state-owned power company, to supply the Manzanillo LNG regasification terminal in Colima, along Mexico's Pacific coast. According to industry accounts, contract volumes start at 700,000 tons per year in 2011, rising to 3.8 million tons per year in 2015. The remaining output from Peru LNG would be available for spot sales or additional term contracts.

Other Developments

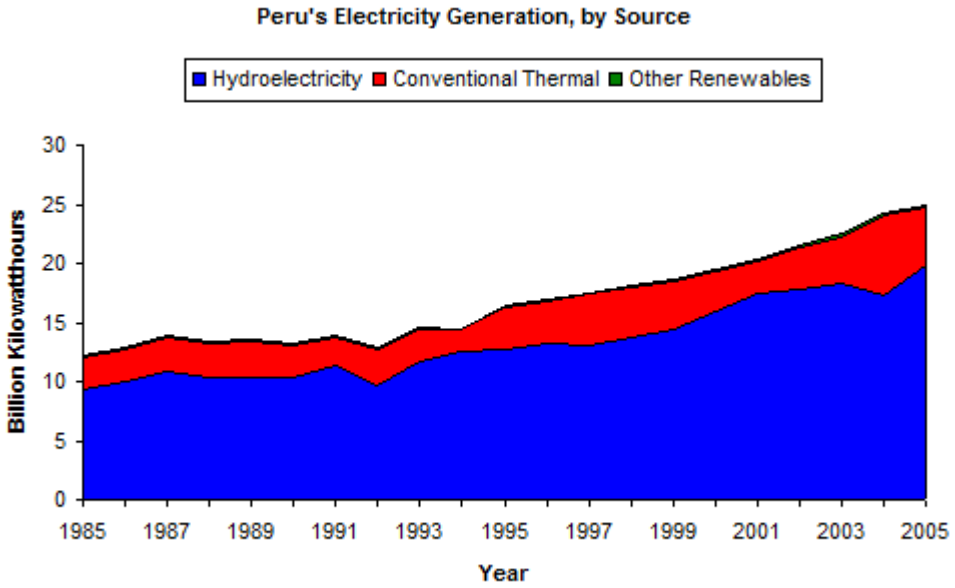
Besides Camisea, the largest concentrations of Peru's natural gas production includes the Aguaytia gas field (Maple Gas) in central Peru, Block X (Petrobras) in the northwest region, and Block Z-2B (Petro-Tech) located off the northwest coast. In 2008, Repsol-YPF announced a new find in Block 57, near the Camisea project. BPZ Energy is developing the Corvina natural gas project in the offshore Block Z-1 in northwest Peru. The project is an integrated gas-to-power facility that will include a subsea pipeline and onshore, 160-MW power plant. There have also been discussions of eventually exporting some natural gas to southern Ecuador.

Electricity

The majority of electricity generated in Peru comes from hydroelectricity

In 2005, Peru had 6.0 gigawatts (GW) of installed generating capacity. In that same year, the country generated 25.0 billion kilwatthours of electricity, while consuming 22.6 billion kilowatthours. Even though installed capacity is evenly divided between hydroelectricity and conventional thermal, 80 percent of Peru's total electricity generation in 2005 came from hydroelectric facilities: conventional thermal plants generally operate only during peak load periods or when weather factors dampen hydroelectric output.

The largest hydroelectric facility in the country is the Mantaro Complex in southern Peru, operated by state-owned Electroperu. Two hydroelectric plants at the complex generate over one-third of Peru's total electricity supply from 900 megawatts (MW) of installed capacity. In February 2006, Egecen S.A. completed construction of the 130-MW, Yuncán hydroelectric plant, located northeast of Lima. The Peruvian government awarded operation rights of the plant to EnerSur, a subsidiary of Brussels-based Suez Energy International.



Source: EIA Peru Country Energy Profile

Sector Organization

In 1992, the Peruvian government enacted the Electric Power Concession Law, which allowed for the privatization of the electricity sector and promoted competition and efficiency within the industry. Nevertheless, the Peruvian government still maintains an important position within the sector. The single largest generating company in Peru is Electroperu, majority-owned by the Peruvian government, which operates the Mantaro hydroelectricity complex. However, around four-fifths of Peru's electricity is generated by the private sector. The largest electricity distributor in Peru is Edelnor, a subsidiary of Endesa, which operates in Lima and the surrounding area.

Peru has two main power transmission grids, one covering the north and center parts of the country, the other serving the south. An interconnector runs between the two along the Pacific coast. The largest transmission company in Peru is the Colombia-based ISA Group, which controls over half of the transmission grid in the country through its subsidiaries Red de Energia del Peru and Interconexion Electrica ISA Peruvian law ensures that all generating and distributing companies have fair, non-discriminatory access to the national transmission grid.

Profile

Energy Overview

Proven Oil Reserves (January 1, 2008E)	0.9 billion barrels
Oil Production (2007E)	113.2 thousand barrels per day
Oil Consumption (2007E)	170 thousand barrels per day
Crude Oil Distillation Capacity (2008E)	193 thousand barrels per day
Proven Natural Gas Reserves (January 1, 2008E)	8.7 trillion cubic feet
Natural Gas Production (2006E)	63 billion cubic feet
Natural Gas Consumption (2006E)	63 billion cubic feet
Recoverable Coal Reserves (2004E)	1,168 million short tons
Coal Production (2006E)	0.02 million shot tons
Coal Consumption (2006E)	1.3 million short tons
Electricity Installed Capacity (2005E)	6.0 gigawatts
Electricity Production (2005E)	25.0 billion kilowatt hours
Electricity Consumption (2005E)	22.6 billion kilowatt hours
Total Energy Consumption (2005E)	0.6 quadrillion Btus*, of which Oil (56%), Hydroelectricity (33%), Coal (6%), Natural Gas (5%)
Total Per Capita Energy Consumption (2005E)	22.8 million Btus
Energy Intensity (2005E)	4,281 Btu per $2000-PPP**

Environmental Overview

Energy-Related Carbon Dioxide Emissions (2005E)	31.3 million metric tons
Per-Capita, Energy-Related Carbon Dioxide Emissions (2005E)	1.1 metric tons
Carbon Dioxide Intensity (2005E)	0.2 Metric tons per thousand $2000-PPP**
Environmental Issues	deforestation (some the result of illegal logging); overgrazing of the slopes of the costa and sierra leading to soil erosion; desertification; air pollution in Lima; pollution of rivers and coastal waters from municipal and mining wastes
Major Environmental Agreements	party to: Antarctic-Environmental Protocol, Antarctic-Marine Living Resources, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Marine Dumping, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands, Whaling signed, but not ratified: none of the selected agreements

Oil and Gas Industry

Organization	Perupetro, which started operating in 1993, is the state company responsible for overall regulation and licensing of the country's oil and gas industries. Perupetro also negotiates oil and gas contracts with companies to explore and/or produce in Peru.
Major Oil/Gas Ports	Callao, Chimbote, Ilo, Iquitos, Matarani, Paita, Pucallpa, Salaverry, San Martin, Talara, Yurimaguas
Major Natural Gas Fields	Camisea and Aguaytia
Major Pipelines	Norperuano crude oil pipeline (250,000 bbl/d capacity)
Major Refineries (capacity, bbl/d)	La Pampilla Lima (102,000); Talara (62,000); Iquitos Loreto (10,500); Conchan (13,500); Pucallpa (3,250); El Milagro (1,700)

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.
**GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

Links

EIA Links
EIA - Country Information on Peru

U.S. Government
CIA World Factbook - Peru
U.S. Commercial Service: "Doing Business in Peru?"
U.S. Country Commercial Guide on Peru
U.S. Embassy in Peru
U.S. State Department Consular Information Sheet on Peru

Foreign Government Agencies
Fonafe
Ministry of Energy and Mines

Oil and Natural Gas
Graña y Montero
Hunt Oil
Maple
PeruPetro
Camisea
Peru LNG

Sources

Aguaytia Energy Group
Americas Oil and Gas Insight
Associated Press
Business News Americas
Business Wire
CIA Factbook
Dallas Morning News
Dow Jones
Economist
EFE News Service
Electric Utility Week International
Electroperu
El Comercio
Energy Day
Financial Times
Fonafe
Global Insight
Global Power Report
Houston Chronicle

International Energy Agency
International Oil Daily
International Water Power and Dam Construction
Interpress Service
Latin America Monitor
Latin America News Digest
Latin Petroleum
Natural Gas Week
Noticias Financieras
Oil and Gas Journal
Oil Daily
Peru 's Ministry of Energy and Mines
Perupetro
Petroleum Economist
Petroperu
PR Newswire
Platts
Reuters
Trade Finance
U.S. Energy Information Administration
World Gas Intelligence
World Markets Analysis

Contact Info

cabs@eia.doe.gov
(202)586-8800
cabs@eia.doe.gov